

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Michigan State University

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Chelsea'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 29th day of November in the year of our Lord one thousand nine hundred and ninety-six.

Attest:

Marsha G. Stanton
Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

Jan Phillipsman
Secretary of Agriculture



(INSTRUCTIONS ON REVERSE)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Phone No. (517) 353-9545

PHONE (include area code):

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)
- a. ☒ Exhibit A, Origin and Breeding History of the Variety
- b. ☒ Exhibit B, Novelty Statement
- c. ☒ Exhibit C, Objective Description of Variety
- d. ☒ Exhibit D, Additional Description of Variety
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
- g. ☒ Filing and Examination Fee (\$2,325) made payable to "Treasurer of the United States"
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act) ☒ YES (If "YES," answer items 16 and 17 below) ☐ NO (If "NO," skip to item 18 below)
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ YES ☐ NO
17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☒ FOUNDATION ☐ REGISTERED ☒ CERTIFIED
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? ☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____). ☒ NO
19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? ☐ YES (If "YES," GIVE NAMES OF COUNTRIES AND DATES) _____ ☒ NO
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.



| | | |
|--|---|-----------------|
| SIGNATURE OF APPLICANT [Owner(s)] | CAPACITY OR TITLE | DATE |
|  | Assistant Vice President for Finance | August 30, 1993 |
| SIGNATURE OF APPLICANT [Owner(s)] | CAPACITY OR TITLE | DATE |
|  | | |

Exhibit A. Origin and Breeding History of Chelsea Wheat

Origin

'Chelsea' is a soft white winter wheat (*Triticum aestivum* L.) developed by Michigan State University. Michigan State's wheat breeding program seeks to develop varieties exhibiting high and stable yield combined with superior soft wheat milling and baking properties. Chelsea wheat is a direct result of efforts aimed at attaining that objective.

Certified seed will be available to farmers in 1993. Chelsea was developed primarily for circumstances analogous to the wheat production regions of Michigan's lower peninsula.

Chelsea is a pure-line selection from the 1978 cross 781530, which has the parentage SWD71242-16H-01H-OP / B2141 // B5219.

SWD71242-16H-01H-OP was entry 69 in the 1976-77 International Winter X Spring Screening Nursery and has the parentage 'Leda'/3/'Siete Cerros 66'/'Ciano'/'Calidad'.

The parentage of MSU line B2141 is 'Suwon 92'/'Brevor'/'5*'Genesee'(A6506)/4/(A4528) 'Norin 10'/'Brevor'/'Yorkwin'/3/3*'Genesee'.

The parentage of MSU line B5219 is 'Nadadores 63'/'Yorkstar'/5/'Cornell 595'2/'Redcoat'/4/'Norin 10'/'Brevor'/'Yorkwin'/3/3*'Genesee'.

F_{2:3} head rows from the 781530 cross were planted in 1981. F_{2:4} bulk selections were subjected to a further round of head selection resulting in a set of F_{4:5} head rows which were planted in 1983. Two subsequent generations of bulk selection resulted in an F_{4:6} pure line designated C5023. C5023 was evaluated in yield trials from 1986 through 1992. Breeders seed of Chelsea was initially constituted in 1990 from yield test derived F_{4:11} seed of C5023. A subsequent batch of breeders seed has been constituted from a bulk of approximately 4000 F_{11:12} head rows derived from the initial Chelsea breeders seed.

Chelsea has been stable and uniform as described in exhibit "C" in the three years (1991-1993) since creation of the initial lot of breeders seed. Prior to that, Chelsea was stable and uniform for head morphology, relative maturity, leaf rust resistance, relative milling and baking qualities, and powdery mildew resistance for 5 generations.

Exhibit B. Novelty Statement (Chelsea).

Chelsea is an awned soft white winter wheat which has bronze or brown colored head chaff at maturity. the head is medium to large, tapering slightly towards the apex. In Michigan, it is the only soft white winter wheat which is awned and has bronze glumes. "Houser" (CI 17736) is the most similar soft white wheat variety recently grown in the eastern United States. Houser is also a soft white winter wheat with awns, but unlike Chelsea which has bronze or brown head chaff, Houser has white chaff.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (TRITICUM SPP.)

INSTRUCTIONS: See Reverse.

| | |
|--|--|
| NAME OF APPLICANT(S) Michigan Agricultural Experiment Station | FOR OFFICIAL USE ONLY |
| ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) 109 Agricultural Hall Michigan State University East Lansing, MI 48824-1039 | PVPO NUMBER 9300302 |
| | VARIETY NAME OR TEMPORARY DESIGNATION CHELSEA |

Place the appropriate number that describes the varietal character of this variety in the boxes below.

Place a zero in first box (e.g., 0 8 9 or 0 9) when number is either 99 or less or 9 or less.

1. KIND:

1 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

2 1 = SPRING 2 = WINTER 3 = OTHER (Specify) 1 1 = SOFT 3 = OTHER (Specify)
2 = HARD

1 1 = WHITE 2 = RED 3 = OTHER (Specify)

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

1 6 3 FIRST FLOWERING from 1/1 1 6 7 LAST FLOWERING from 1/1

4. MATURITY (50% Flowering):

NO. OF DAYS EARLIER THAN 1 = ARTHUR 2 = SCOUT 3 = CHRIS
0 6 NO. OF DAYS LATER THAN 1 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (From soil level to top of head):

1 0 6 CM. HIGH
1 5 CM. TALLER THAN 1
CM. SHORTER THAN 1 1 = ARTHUR 2 = SCOUT 3 = CHRIS
4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (See reverse):

2 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHUR COLOR:

1 1 = YELLOW 2 = PURPLE

8. STEM:

1 Anthocyanin: 1 = ABSENT 2 = PRESENT 1 Waxy bloom: 1 = ABSENT 2 = PRESENT
1 Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT 1 Internodes: 1 = HOLLOW 2 = SOLID
0 5 NO. OF NODES (Originating from node above ground) 2 1 CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

1 Anthocyanin: 1 = ABSENT 2 = PRESENT 1 Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

2 Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 1 Flag leaf: 1 = NOT TWISTED 2 = TWISTED
3 = OTHER (Specify): 1 Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
1 Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
1 4 MM. LEAF WIDTH (First leaf below flag leaf) 2 2 CM. LEAF LENGTH (First leaf below flag leaf)

11. HEAD:

☐ 1 Density: 1 = LAX 2 = DENSE ☐ 1 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE
4 = OTHER (Specify) _____

☐ 4 Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

☐ 5 Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
5 = BROWN 6 = BLACK 7 = OTHER (Specify) _____

☐ 0 ☐ 8 CM. LENGTH ☐ 1 ☐ 5 MM. WIDTH

12. GLUMES AT MATURITY:

☐ 2 Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)
☐ 2 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

☐ 3 Shoulder: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED
shape: 4 = SQUARE 5 = ELEVATED 6 = APICULATE ☐ 1 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

☐ 1 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

☐ 1 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

☐ 3 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

☐ 3 Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL ☐ 1 Check: 1 = ROUNDED 2 = ANGULAR

☐ 1 Brush: 1 = SHORT 2 = MEDIUM 3 = LONG ☐ 1 Brush: 1 = NOT COLLARED 2 = COLLARED

☐ Phenol reaction: 1 = IVORY 2 = FAWN 3 = LT. BROWN
(See instructions): 4 = BROWN 5 = BLACK

☐ 1 Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

☐ 0 ☐ 6 MM. LENGTH ☐ 0 ☐ 3 MM. WIDTH ☐ 4 ☐ 0 GM. PER 1000 SEEDS

17. SEED CREASE:

☐ 1 Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
2 = 80% OR LESS OF KERNEL 'CHRIS'
3 = NEARLY AS WIDE AS KERNEL 'LEMHI' ☐ 1 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'
2 = 35% OR LESS OF KERNEL 'CHRIS'
3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 STEM RUST (Races) ☐ 2 LEAF RUST (Races) ☐ 0 STRIPE RUST (Races) ☐ 0 LOOSE SMUT
☐ 2 POWDERY MILDEW ☐ 0 BUNT ☐ OTHER (Specify) _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 SAWFLY ☐ 0 APHID (Bydv.) ☐ 0 GREEN BUG ☐ 0 CEREAL LEAF BEETLE
☐ 0 OTHER (Specify) _____ HESSIAN FLY } ☐ GP ☐ A ☐ B ☐ C
RACES: ☐ D ☐ E ☐ F ☐ G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

| CHARACTER | NAME OF VARIETY | CHARACTER | NAME OF VARIETY |
|-----------------|-----------------|-----------------------|-----------------|
| Plant tillering | Frankenmuth | Seed size | Augusta |
| Leaf size | Frankenmuth | Seed shape | Frankenmuth |
| Leaf color | Frankenmuth | Coleoptile elongation | Frankenmuth |
| Leaf carriage | Frankenmuth | Seedling pigmentation | Frankenmuth |

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggles and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture

Exhibit D. Additional Description of variety (Chelsea).

MORPHOLOGICAL DESCRIPTION

Chelsea is a large seeded, soft white winter wheat variety with bronze chaff and 2 to 3 inch awns. Initial breeder and foundation contains up to 2 % variant types, including a taller bronze-chaffed awned type, a bronze-chaffed awnless type, a white-chaffed awnless type and a white-chaffed awned type, each of which may be of variable height. Some of the bronze-chaffed awnless variants tend to be somewhat clavate (club-shaped). Chelsea has moderate plant height similar to that of Augusta. Chelsea will flower and mature 1-3 days later than Augusta or Frankenmuth when grown in Michigan. Chelsea's winterhardiness is not known to differ from that of Augusta and Frankenmuth. Chelsea exhibits moderate to high levels of adult plant resistance to leaf rust (causal organism *Puccinia recondita*) and powdery mildew (causal organism *Erysiphe graminis*). Chelsea also exhibits good levels of resistance to wheat spindle streak virus.

Chelsea is uniform and stable and contains variants at levels described above. Breeder seed contains up to 0.6%.

Performance Record for Chelsea.

PERFORMANCE

Agronomic and quality performance data for Michigan tests conducted between 1986 and 1992 are summarized in the attached tables. In multi-location yield tests conducted in Michigan from 1989 through 1992, Chelsea averaged 79.0 bushels/acre across the 26 sites, compared with 73.4 and 71.4 bushels per acre for Augusta and Frankenmuth, respectively, in the same trials. Chelsea's advantage over Augusta and Frankenmuth is particularly apparent at test sites in Michigan's 'Thumb' region. Chelsea's 1989-92 yield average (7 site-years) in the Thumb was 96.7 bushels per acres versus 82.8 for Augusta and 80.9 for Frankenmuth. Chelsea has good test weight. Yearly evaluations at the USDA Soft Wheat Quality Laboratory in Wooster, Ohio have shown Chelsea to possess superior milling and baking properties.

Exhibit D, part 2. Chelsea Performance Data 1986-1992

| Exhibit D, part 2. Chelsea Performance Data 1986-1992 | | | | | | | | | | | | | | | | | | |
|---|----------|--------------|------------------|----------------|--------------------|-------------------|---------------------------|--------------------------|--------------|------|--------------|----------------|----------------------|-------------------|--------------|-----------------|-------------------------------------|-------------------------------------|
| Year | Trial ID | Locations | YIELD BU/Acre | TEST WEIGHT | HEIGHT (inches) | ANTHESI D.O.Y. | QUALITY SCORES | | | | SOFT. EQ. | FLOUR YIELD | AWRC | POWDERY MILDEW | LEAF RUST | GLUME BLOTCH | WSSV | LODGING |
| | | | | | | | MILLING (standard=100) | BAKING (standard=100) | PROTEIN % | | | | | | | | | |
| 1992 | 10 | Chelsea | 103.9 | 57.3 | 37.0 | 161.0 | | | | | | | | | | | | |
| | | Augusta | 102.8 | 56.3 | 38.0 | 161.0 | | | | | | | | | I=3 | | I=2, L=5 | |
| | | Trial Mean | 98.4 | 58.0 | 37.7 | 158.3 | | | | | | | | | I=5 | | I=3, L=3 | |
| | | I.s.d. | 8.3 | 1.2 | | | | | | | | | | | | | | |
| 1991 | 10 | Chelsea | 113.2 | | | | | | | | | | | | | | | |
| | | Augusta | 111.5 | | | | | | | | | | | | | | | |
| | | (Thumb only) | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 1990 | 1 | Chelsea | 66.9 | 53.7 | 41.0 | 154.0 | 102.9 | 100.8 | 9.0 | 57.8 | 74.0 | 53.7 | | | | | | I=1, H=2 I=6, M=2 I=3, M=2 I=4, L=1 |
| | | Augusta | 61.1 | 51.4 | 43.0 | 153.0 | 100.0 | 100.0 | 9.1 | 54.4 | 73.8 | 51.9 | | | | | I=8, H=5 I=6, M=5 I=5, M=3 I=6, L=1 | |
| | | Trial Mean | 69.2 | 52.6 | | | | | | | | | | | | | | |
| | | I.s.d. | 5.0 | 3.7 | | | | | | | | | | | | | | |
| 1989 | 1 | Chelsea | 80.2 | | | | | | | | | | | | | | | |
| | | Augusta | 71.1 | | | | | | | | | | | | | | | |
| | | (Thumb only) | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 1988 | 2 | Chelsea | 74.3 | 55.6 | 40.1 | 163.5 | 103.9 | 102.7 | 7.2 | 56.6 | 75.6 | 54.1 | I=1, M=1 | | | | | |
| | | Augusta | 70.3 | 54.4 | 40.9 | 162.5 | 100.0 | 100.0 | 9.7 | 54.0 | 75.4 | 52.9 | I=3.5, M=7 I=10, H=5 | | | | | |
| | | Trial Mean | 69.6 | 54.5 | | | | | | | | | | | | | | |
| | | I.s.d. | 3.9 | 0.9 | | | | | | | | | | | | | | |
| 1987 | 4 | Chelsea | 70.5 | 54.2 | | | | | | | | | | | | | | |
| | | Augusta | 58.6 | 52.1 | | | | | | | | | | | | | | |
| | | Trial Mean | 60.9 | 53.1 | | | | | | | | | | | | | | |
| | | I.s.d. | 4.6 | 1.2 | | | | | | | | | | | | | | |
| 1986 | 8 | Chelsea | 61.0 | 58.8 | | | | | | | | | | | | | | |
| | | Augusta | 59.2 | 56.6 | | | | | | | | | | | | | | |
| | | Trial Mean | 56.4 | 57.7 | | | | | | | | | | | | | | |
| | | I.s.d. | 3.7 | 0.6 | | | | | | | | | | | | | | |
| 1985 | 6 | Chelsea | 70.0 | 56.5 | | | | | | | | | | | | | | |
| | | Augusta | 66.6 | 56.1 | | | | | | | | | | | | | | |
| | | Trial Mean | 65.8 | 56.3 | | | | | | | | | | | | | | |
| | | I.s.d. | 5.2 | 1.5 | | | | | | | | | | | | | | |
| 1984 | 2 | Chelsea | 43.5 | 51.9 | 41.0 | | | | | | | | | | | | | |
| | | Augusta | 40.0 | 50.0 | 43.0 | | | | | | | | | | | | | |
| | | Trial Mean | 34.0 | 48.7 | 42.0 | | | | | | | | | | | | | |
| | | I.s.d. | 9.2 | 2.8 | | | | | | | | | | | | | | |
| County site designations: B=Mendon, I=Ingham, H=Huron, L=Leawee, M=Monroe, R=Saginaw. | | | | | | | | | | | | | | | | | | |
| 1990-92 Disease Rating Scales = 0-9 (0=best, 9=worst); 1990 Leaf Rust scores = Actual % on Flag Leaf; 1979-1989 Disease Rating Scales = 0-5 (0=best, 5=worst) | | | | | | | | | | | | | | | | | | |
| LSDs all at 0.05 alpha levels. (prepared for PVP application, 8/9/93) | | | | | | | | | | | | | | | | | | |

EXHIBIT E**STATEMENT OF OWNERSHIP**

CHELSEA was developed by a team of plant scientists in the Department of Crop and Soil Sciences under the Michigan Agriculture Experiment Station at Michigan State University. The ownership rights are the property of Michigan State Univesity.